DOCUMENT RESUME

ED 386 863 EC 304 252

AUTHOR	Chard, David J.; And Others
TITLE	Word Recognition: Curricular and Instructional Implications for Diverse Learners. Technical Report No. 16.
INSTITUTION	National Center To Improve the Tools of Educators, Eugene, OR.
SPONS AGENCY	Special Education Programs (ED/OSERS), Washington, DC.
PUB DATE	20 Feb 95
NOTE	21p.
PUB TYPE	Guides - Non-Classroom Use (055)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Beginning Reading; Curriculum Development; Elementary Secondary Education; *Instructional Design; Learning Strategies; *Reading Difficulties; *Reading Instruction; Special Needs Students; Teaching Methods; *Word Recognition; Word Study Skills

ABSTRACT

Research-based instructional priorities in word recognition are considered as a framework for designing instruction for diverse learners. The framework involves teaching prerequisite skills in combination with word recognition instruction, teaching alphabetic understanding (i.e., letter-sound correspondence) in combination with word recognition, and teaching blending of words and encouraging readers to make sense of the words they blend. Use of the following curricular design principles is addressed: conspicuous strategies, strategic integration, mediated scaffolding, primed background knowledge, and judicious review. The paper concludes that primary emphasis on this framework and planful integration with other literacy activities may reduce the risk faced by diverse learners in beginning reading as it now is commonly taught. (SW)

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EC304252

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Technical Report No. 16 produced for the National Center
to Improve the Tools of Educators, University of Oregon

Funded by the U.S. Office of
Special Education Programs

Word Recognition: Curricular and Instructional Implications for Diverse Learners

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February 20, 1995

Running Head: WORD RECOGNITION IMPLICATIONS

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Review of Converging Evidence

Learning to read words is anything but natural. On the contrary, it requires integration of numerous complex processes. While successful acquisition and application of these processes is incidental for many children, others require systematic and planful teaching. From our synthesis of beginning reading research (Chard, Simmons, & Kameenui, 1994), four areas of convergence bear implications for word recognition for children with diverse learning needs.

- Reading comprehension and other higher-order reading activities depend on strong word recognition skills;
- Strong word recognition requires prerequisite learner understanding that (a) words can be "spoken" or "written," (b) print corresponds to speech, and (c) words are composed of phonemes;
- Alphabetic understanding (i.e., a reader's understanding that words are composed of graphemes and letter-sound correspondences) facilitates word recognition;
- Phonological recoding (i.e., translating a word into its phonological counterpart, remembering the correct sequence of sounds, blending the sounds together, and searching memory for a real word that matches that string of sounds) combined with word frequency mediates word recognition.

It is important to note that our focus is on learning to read words independently does not pre-empt or preclude simultaneous attention to other reading processes. Rather, throughout the process of learning to read, storyreading and demonstrations of the role of reading for information should be integrated with learning to master the code. Once early readers learn some letter-sound correspondences, they can learn to blend those sounds into simple words. Similarly,

as children begin to blend sounds into words, the words can be put into sentences to form connected texts.

In the next section, we describe big ideas from our review that are instructionally important and empirically validated. We attempt to connect research and practice by responding to two focal questions: (a) What are the research-based instructional priorities, or "big ideas," in word recognition? and (b) For the instructional priorities of word recognition, what is the existing research evidence regarding curriculum design?

Research-Based Instructional Priorities in Word Recognition: Big Ideas

The four main areas of convergence identified from the review of reading research by Chard, Simmons, and Kameenui (1994) are captured by three big ideas that serve as a framework for designing instruction in word recognition for diverse learners:

1. Teach prerequisite skills in combination with word recognition instruction.
2. Teach alphabetic understanding (i.e., letter-sound correspondence) in combination with word recognition.
3. Teach blending of words and encourage readers to make sense of the words they blend.

The prerequisites to word recognition of print awareness and phonological awareness are addressed in detail in two other syntheses (Gunn, Simmons, & Kameenui, 1995; Smith, Simmons, & Kameenui, 1995) and, therefore, will not be addressed in this discussion. In the following section, we discuss Big Ideas 2 and 3 in relation to a framework of curriculum design principles that include conspicuous strategies, strategic integration, mediated scaffolding, primed background knowledge, and judicious review to render the implications more explicit and employable.

In the following section, we discuss these procedural curriculum design principles in combination with the big ideas of teaching (a) word recognition in combination with prerequisite skills, (b) alphabetic understanding, and (c) phonological recoding to illustrate how to translate research into practice. Because recent research has not focused on reading acquisition, but rather on reading and writing at higher levels (Juel, 1991; Pearson, 1993), we found conceptual convergence that students need the big ideas of word recognition, but procedural paucity on how to teach the big ideas. In other words, the procedural details were often scant despite strong support for the underlying concepts (i.e., phonological recoding). The following sections should not be viewed as a prescription, but rather as reasonable extensions of areas of convergence.

Evidence of Curriculum Design in Word Recognition

Conspicuous Strategies

Conspicuous strategies are sequences of teaching events and teacher actions that make explicit the steps necessary to enable a learner to read words automatically and fluently. To apply the big idea of alphabetic understanding, for example, a teacher must develop a plan of action for how to teach students letter-sound correspondences and how to apply those correspondences to word recognition. The plan of action would involve a series of teacher actions and salient steps for the learner to apply letter-sound correspondences independently. For diverse learners, such steps must be explicit and unambiguous.

Alphabetic understanding. The first step in a conspicuous strategy for alphabetic understanding is to teach individual letter-sound correspondences. However, before offering an example of a conspicuous strategy, it may be helpful to describe instruction of letter-sound correspondences that is not conspicuous. For example, it would not be conspicuous to teach letter-sound correspondence within the context of words. Approaches such as this place extraordinary responsibility on

the learner to isolate the letter-sound correspondence being taught from other letters in proximity. Some commercial reading programs attempt to teach letter-sound correspondences within words to avoid decontextualized language as when one pronounces phonemes in isolation (Adams, 1990). Still other programs avoid a conspicuous approach to teaching letter-sound correspondences by not addressing letter-sound correspondences at all (Adams, 1990). Evidence suggests that neither approach leads students efficiently to the instructional goal--alphabetic understanding.

In contrast to inconspicuous strategies, an explicit and unambiguous approach to teaching letter-sound correspondences would begin when the teacher presents a letter symbol and models the corresponding sound. For example, the teacher points to the letter m on the board or in a book and says "mmmmmmm." Next, the teacher tests student acquisition of the correspondence by having the group produce the sound corresponding to the letter m. Finally, once the teacher is certain that students know the correspondence, individuals can be tested.

This strategy is simple and conspicuous. Each letter-sound pair is presented in isolation without the distractions of other correspondences. The approach benefits the reader by ensuring that the connection between letter and corresponding sound is salient, and with frequent exposure the connection becomes automatic for students. Such automaticity is critical for poor readers to begin to sound out and blend words. Despite converging evidence implying the importance of a conspicuous strategy for alphabetic understanding, no primary studies in this review were identified that tested this principle explicitly.

Phonological recoding. Across models of word recognition, researchers agreed on the importance of phonological recoding, which refers to the process of identifying the sounds in a word, blending the sounds together, and searching for the meaning of the word in memory. While phonological recoding need only occur

a few times for typical readers to be able to read with ease and speed, diverse learners must be encouraged to look carefully at spellings and sounds and to repeatedly sound out and blend words (Reitsma, cited in Adams, 1990). Phonological recoding can be taught as an explicit strategy once students master a few letter-sound correspondences. The next step is to sound out the letters of words and blend them together. Blending the sounds in words is familiar to students who have practiced auditory blending tasks as part of phonemic awareness.

A conspicuous strategy for sounding out and blending words could be taught with the teacher first pointing to each letter of a word and then saying its sound without stopping between the sounds. Second, the teacher could sound out the word again with the students. Careful monitoring of the children's sounding out informs the teacher whether the children are automatic with the letter-sound correpondences. Next, the students can sound out the word as the teacher points to the sounds. Finally, students should be encouraged to blend the word at a normal speed. The teacher should take care to test individual students.

The strategy described above is required as it represents the first step in teaching phonological recoding. As learners master letter-sound correspondences and become more facile with sounding out and blending, similar strategies can be taught that emphasize frequent sounding out and blending of word parts (e.g., "an" or "it") and common spelling patterns (e.g., "-th" or "-ing") that can be preceded by a host of beginning sounds. Research evidence strongly supports that for skilled readers word recognition is effortless and automatic because they repeatedly sound out and blend familiar words (see Adams, 1990, for detailed discussion). Therefore, frequent opportunities to sound out and blend words is particularly critical for diverse learners. Practice at blending common word parts and letter patterns promotes automaticity as students no longer approach each word as a new string of letters.

Strategic Integration

Teaching conspicuous strategies in isolation compromises the utility of the strategies. Repeatedly, research reported the relation between print awareness, phonemic awareness, alphabetic understanding, phonological recoding and comprehension. Therefore, it is imperative that word recognition instruction reflect the strategic integration of these processes. Strategic integration refers to the planful consideration and sequencing of phonologic and alphabetic tasks to promote reading acquisition. Numerous studies have determined that the most efficacious approach to early reading includes a combination of instruction in phonemic awareness and letter-sound correspondence. Similarly, phonological recoding is a combination of letter-sound correspondences, blending, and comprehension strategies. In the following section we describe considerations for integrating the components of word recognition in early reading instruction.

Alphabetic understanding. The simplicity of teaching letter-sound correspondences belies the complexity of integrating such correspondences with other correspondences and within words. The first point of integration is to provide students the opportunity to discriminate new letter-sound correspondences from previously learned correspondences. Being able to discriminate letter-sound correspondences is important for beginning readers to understand the nature of our alphabetic language (Adams, 1990). Toward that goal, teachers could present newly introduced letters in the proximity of earlier introduced and mastered letters, with new letters appearing more often than previously learned letters.

Since the goal of word recognition instruction is to teach learners to read connected text as quickly as possible, it is necessary to choose strategically the order in which to teach letter sound correspondences. The following guidelines may help:

1. Teach most common letter-sound correspondences (e.g., a, m, t, s, i, f, d, r) before less common ones (e.g., p, y, x, q, z).

2. Expedite learners' movement from sounding out and blending words to reading connected text by teaching those correspondences in which the same sound is represented by multiple patterns (e.g., /e/ as in me, sea, see, neat, and green).

These instructional strategies will enable learners to generalize sounds across a number of new words and will make meaningful texts more accessible.

Phonological recoding. It is imperative that learners begin reading words before they learn all letter-sound correspondences. Therefore, as soon as learners have mastered a few letters, they should be used to construct decodable words. Thus, a second point of integration: Learners should be taught how to blend the sounds to form words. Initially, students may struggle with the sounding-out and blending process. With planfully integrated instruction, however, the number of mastered letter-sound correspondences will increase gradually, the process of sounding out and blending will become more automatic, and the numbers of words being recoded will expand.

A third point of strategic integration is the use of words in context. As students learn the strategy for sounding out and blending words, it is crucial that they read these decodable words in stories. Although it is extremely difficult to create interesting stories with highly stipulated decodable vocabularies, there are a number of ways to move learners from reading only isolated words to reading words in context. For example, although the list of decodable words is short, teachers can systematically point out decodable words and have learners read them in the story. This requires careful selection of stories containing words that learners are able to read.

The following steps should be considered in the strategic integration of phonological recoding:

1. Select as examples words that utilize the most common sounds of letters.

2. Select words to be taught that include only letters that students have mastered in letter-sound correspondences.
3. Teach the connection between strategies explicitly (e.g., "We have been learning the sounds of some letters. Today those letters are going to be put into words. We are going to say those sounds and blend them together to make the words.").
4. Integrate phonological recoding of words into classroom storyreading as quickly as possible (i.e., If instruction focuses on sounding out and blending the word "and," have learners find the word "and" in the day's story and have them read it at each occasion).
5. When possible, create or find stories that contain only words students can read independently.

Mediated Scaffolding

Diverse learners may not benefit fully from traditional reading curricula. Although reading research has consistently supported systematic phonics for helping diverse learners read successfully, most reading curricula do not contain a systematic phonics component. Diverse learners' need for systematic instruction can be accommodated by using mediated scaffolds.

Mediated scaffolds are external supports provided by the teacher, tasks, and materials during initial learning of word recognition. As such, mediated scaffolds provide learners with guidance and support toward independence. Beginning readers' acquisition of letter-sound correspondences can be mediated in a number of ways, so that students move successfully and efficiently from unknowing to knowing. Mediated scaffolding can come in the form of (a) teacher assistance, (b) peer assistance, and (c) task sequence and selection. The scaffolds should meet the needs of the beginning reader and should be diminished as the reader grows more

facile with the prerequisites of reading, letter-sound correspondences, and phonological recoding.

Alphabetic understanding. For diverse learners, teacher-mediated scaffolding must take the form of prompt, direct error correction and teacher modeling of newly introduced letter-sound correspondences. Knowledge of letter-sound correspondences must be automatic. Therefore, student errors must be identified and corrected before students have opportunities to practice incorrect responses. In addition, new letter-sound correspondences must be modeled explicitly for beginning readers. Unfortunately, many commercial reading programs replace modeling new information with testing. For example, instead of modeling /m/ while pointing to the letter, directions are common in which the teacher "asks students what sound the letter m makes" before any initial instruction on the correspondence. Omitting the modeling step in teaching letter-sound correspondences is similar to missing the first rung on the ladder of alphabetic understanding. Without modeling, the burden is placed on the learner to intuit the corresponding sound, reducing the probability that the learner will learn the correspondence successfully.

Choosing which letter-sound correspondences to teach and which order to teach them in serves as another form of mediated scaffolding. Although there are no explicit empirically validated guidelines for ordering the introduction of letter-sound correspondences, some logical principles may be considered.

1. Teach the most common sound for each new letter. For example, when introducing the letter g, it would be appropriate to teach the sound of g in "get" instead of the sound of g in "gem." Limiting the number of sounds associated with each letter enables the beginning reader to reach automaticity on the most commonly used sounds.

2. Introduce the most common letters before less common letters. Very simply, it makes more sense to teach the letter-sound correspondence for m before x because more words contain the letter m than the letter x.

3. Separate letters and sounds that are either visually or auditorily similar to reduce the beginning reader's chance of confusion. For example, it is important to separate /a/, /e/, and /i/ because it is difficult to discriminate these three sounds. It is equally important to separate the introduction of the letters d and b or n and h.

4. Introduce lower-case letters prior to upper-case letters. For example, instead of teaching that /b/ corresponds with b and B, limiting the correspondence to the lower-case b allows students to master that connection before learning the upper-case correspondence.

In sum, mediated scaffolding systematically structures the load and distribution of print and sound stimuli that the beginning reader has to consider, while providing ample time to acquire and practice newly learned letter-sound correspondences.

Phonological recoding. When students begin to sound out and blend words, teacher scaffolding is crucial. Teacher demonstration must illustrate that sounds should be connected without stops between individual sounds. The difficulty of teaching children to connect sounds during phonological recoding should not be underestimated. For example, students must coordinate saying one sound while identifying the corresponding sound of the next letter. Once the process has been modeled, a second scaffold involves the teacher sounding out with students before expecting them to recode independently. In a third form of scaffolding, the teacher points to each sound as students sound out words. This focuses attention on the importance of each individual sound (Adams, 1990).

Task scaffolds differ from teacher scaffolds by being embedded in the tasks and designed to promote reading by reducing the information students must generate

independently. For example, in initial attempts to sound out and blend words children should focus on only two or three words. A reduced number of words allows students to focus on the goal of the initial task, namely, sounding out and blending words. Similarly, tasks can be sequenced such that only firm letter-sound correspondences are included in the phonological recoding tasks. Also, new letter-sound correspondences should be reviewed and mastered before appearing in the sounding out and blending tasks.

Initially, phonological recoding tasks are difficult due to the awkwardness of the process. As students learn the strategy, they should be encouraged to sound out and blend the words "in their head" and read the word as a whole. This progression of tasks approximates the end goal of word reading.

Primed Background Knowledge

Alphabetic understanding. Teaching letter-sound correspondences as the key to alphabetic understanding without connection to words and text may seem like teaching in a vacuum. However, if carefully linked to the beginning reader's background knowledge, letter-sound instruction provides students with information about familiar sounds and symbols that they know are important to the message in text.

To be more specific, connecting letters to sounds first seems to be a clear extension of learning the names and shapes of letters. Adams (1990) discussed in detail the importance of teaching letter names and shapes as a precursor to letter sound correspondence. Adams argued that most children have a firm grasp of letter names before entering school because their parents teach them the "Alphabet Song" (to the tune of "Twinkle, Twinkle Little Star") without showing them the letters. After that, many children are introduced to the letter shapes and the opportunity to trace or write the letters. This progression provides a strong platform from which to leap into letter sounds.

As a result, consideration should be given to what children know about letters and sounds before letter-sound correspondences are taught. Indeed, some researchers suggest that children who are not facile at identifying the names of letters when presented the letter symbol should be pretaught the letters and their names. It is argued that primed background knowledge of letter names will serve as an anchor for the more complex letter-sound correspondences to follow. Additionally, phonological awareness exercises that introduce children to a wide range of phonemes are a critical precursor to linking letters to sounds. Logically, it makes more sense to link the letter s with /s/ if students have already learned and practiced /s/ in phonological exercises such as segmenting the word sam into s - a - m.

Phonological recoding. Prerequisite knowledge for sounding out and blending words (i.e., print awareness, phonological awareness, letter sound correspondences) must be primed prior to engaging students in tasks involving phonological recoding. This means sequencing the prerequisites in such a manner that learners are not expected to perform tasks for which they are not adequately prepared. For example, before students are taught to sound out and blend words, it is important that they have learned how to segment and blend words auditorily (i.e., in the absence of print). Background knowledge of segmenting and blending facilitates a smooth transition to sounding out and blending words in print.

Similarly, care should be taken to teach letter-sound correspondences to mastery before they appear in words to be sounded out and blended. Carefully sequenced instruction prevents students and teachers from becoming frustrated with tasks that involve phonological recoding. Very simply, providing a foundation of background knowledge builds strong word recognition skills.

Judicious Review

Judicious review refers to the sequence and schedule of opportunities readers have to apply and develop facility with sounds and the alphabet. Successful word recognition depends on an intricate review process to reinforce component skills. While the basic notion of review is simple, the requisite characteristics of effective and judicious review are demanding and, therefore, often not realized. We have identified four critical dimensions of judicious review. Specifically, judicious review should be: (a) sufficient to enable students to perform tasks without hesitation; (b) distributed over time; (c) cumulative with information integrated into more complex tasks; and (d) varied to illustrate the wide application of students' understanding of the information. Beyond these characteristics, teachers must determine what to review, when to review, and how to design effective review activities.

What to review. Review activities must focus on content that is essential for improving word recognition. Thus, review should include letter-sound correspondences, spelling patterns, and exercises that (a) occur frequently in oral and written language, (b) are essential to a majority of words, and (c) are of high quality. That is, time should be spent on activities that generalize across most words that students will encounter. Because the content of review will differ from student to student, informal progress monitoring helps discriminate what students have yet to master and what can be reviewed less frequently.

When to review. Research on review has shown that repeated, shorter review distributed over time is more effective than review that is presented all at once (e.g., Dempster, 1991). Word recognition activities are particularly well suited for distributed review. For example, letter-sound correspondences can be introduced and later reviewed in groups. Newly learned information should be reviewed frequently, but as the information is mastered, greater amounts of time

can be interjected between review sessions. It is not advisable to remove information from review activities based on initial success, however. If students are expected to maintain mastery of items, as is the case with many components of word recognition, teachers must ensure that high-utility information and skills are reviewed cumulatively.

Scheduling review the way we have proposed here seems logistically complex. Indeed, the complexity is real. This is primarily because the skills and information learned in beginning reading are likely to affect students' long-term academic success. Care should be taken at this early stage to assist students in maintaining the critical components of word recognition. Fortunately, many studies have documented the effectiveness of repeated reading of favorite books and passages as a system of review once readers become facile with phonological recoding (e.g., Sindelar, Monda, & O'Shea, 1990; Weinstein & Cooke, 1992).

Designing review activities. Contrary to popular belief, review activities need not be rote rehearsal or what many people refer to as "drill and kill." Rather, it is incumbent on teachers to develop flexible and creative methods of helping students maintain knowledge. The only requirement is that review activities include important knowledge and provide opportunities to assess students' understanding.

The following guidelines should be considered in designing review activities for developing strong word recognition skills:

1. Examine students' reading to detect error patterns that have implications for further instruction.
2. Create "review sets" that target specific word recognition activities. For example, for alphabetic understanding, include review sets of letters that were newly introduced, particularly difficult (e.g., /e/ and /i/), as well as correspondences that have not been reviewed recently.

3. Schedule review activities that can be used on multiple occasions within a lesson or across a day. For example, students might read the same short passages (5-10 sentences) three times during a reading lesson. Each reading can be timed to determine fluency gains.
4. Designate more review for new than familiar reading tasks.

Conclusion

We would be remiss if we were to leave the reader with the impression that teaching word recognition should sacrifice attention to building comprehension skills. Indeed, this is not the case. Research suggests that comprehension and word recognition have a reciprocal effect on one another. That is, comprehension is dependent on word recognition, and strong word recognition, while not dependent on comprehension, is enhanced by readers' interest in the content of text.

Keeping in mind the importance of integrating word recognition and beginning comprehension instruction, we must focus on the needs of diverse learners. Diverse learners are at risk of failure in reading. Based on our review of word recognition research, it appears that many diverse learners require a qualitatively different form of instruction; one that is more systematic and planful. Primary emphasis must be placed on helping diverse learners acquire the "deep and thorough knowledge of letters, spelling patterns, and words, and of the phonological translations of all three" (Adams, 1990, p. 416) that are critical to later reading success. Towards this end, we have proposed three big ideas for word recognition instruction:

1. Teach prerequisite skills in combination with word recognition instruction.
2. Teach alphabetic understanding (i.e., letter-sound correspondence) in combination with word recognition.

3. Teach blending of words and encourage readers to make sense of the words they blend.

These big ideas are supported by the proposed framework of instructional design principles including conspicuous strategies, mediated scaffolding, strategic integration, primed background knowledge, and judicious review. Primary emphasis on this framework and planful integration with other literacy activities may reduce the risk faced by diverse learners in beginning reading as it now is commonly taught.

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